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AUTHOR Richardson, John G.; Mustian, R. David
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ABSTRACT

Questionnaire responses from 702 agricultural producers who actively use the North Carolina Agricultural Extension Service (NCAES) and whose farming activities produce at least $10,000 annually revealed perceptions of the current and future capacity of the NCAES to deliver state-of-the-art technological information and the relationships between those perceptions and selected personal factors, farm characteristics, and producer's perceived level of future needs for highly developed technological information. Findings indicated over 81% of producers perceived future needs for more complex technological information to be "somewhat more" or "much more" than current needs; about 90% had positive perceptions of NCAES to deliver needed technological information; and as educational levels of producers advanced, their level of positive perception of NCAES' capacity to provide needed technological information also increased. The results implied that to continue to maintain a positive image as a responsive, needs-oriented agency that effectively delivers usable technological information to all types of producers--whether they are marginal part-time or highly advanced full-time--informational delivery strategies will need to be appropriately varied. (NEC)

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PERCEIVED CAPACITY OF THE NORTH CAROLINA AGRICULTURAL SERVICE TO DELIVER TECHNOLOGICAL INFORMATION: REACTIONS OF AGRICULTURAL PRODUCERS WHO USE EXTENSION INFORMATION

John G. Richardson
Agricultural Extension Service
North Carolina State University

R. David Mustian
Agricultural Extension Service
North Carolina State University

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Perceived Capacity of the North Carolina Agricultural Service to Deliver Technological Information: Reactions of Agricultural Producers Who Use Extension Information

by
John G. Richardson
and
R. David Mustian

Dramatic technological advancements are becoming so commonplace that we seldom give a second thought to advancements in the manipulation in biotechnology or such major scientific projects as the much sought after super collider project from the Federal Government. Regardless of our acceptance and familiarity with technological change, the impact of these changes can be expected to have some impact upon those persons who are the recipients of these technological advancements.

Such technological change has already had a dramatic impact on American agriculture. Indeed, technological advancements have had a significant role in transforming U.S. Agriculture to larger, more specialized units (Schertz et al., 1979). Policy specialists for the U.S. Congress have indicated that the Nation's 100,000 largest farms produce essentially one-half of the total farm output, and much of the emerging technologies will be most applicable to those large, integrated farming operations (Carr et al., 1984). These specialists further suggested that 80 percent of all farms may have goals other than attempting to produce at peak levels. Thus, the question arises as to whether these small and part-time farmers perceive their needs for advancing technological information to be sufficiently

different to impact upon their perceptions of the capacity of the primary agricultural educational agency of the U.S. Department of Agriculture, states and counties, the Agricultural Extension Service, to provide relevant and needed technological information.

Potential goal differences of various segments of the farm population, coupled with technological advancements that are quite complex and foreign to many current Extension staff, raises the question as to the usefulness of Extension as a technological information delivery source in the future (OTA Special Report, 1986). Indeed, in addition to concern that agricultural producers may need to look to information sources other than Extension for their information needs, newly emerging information delivery techniques that integrate the new technology add to the challenges that Extension faces in its program delivery process (Richardson, 1987).

Conceptual Framework

North Carolina agricultural producers' perceptions of the current and future capacity of the North Carolina Agricultural Extension Service (NCAES) to deliver state-of-the-art technological information was the object of inquiry in this study. Perceptions have been theorized to be formed as a result of environmental, physical, cognitive, and affective factors, and the individual's interpretation of those factors (Richardson, 1987). Thus, it was theorized that some specific factors would have a measurable effect on the perceptions formed by those producers.

Personal factors and farm characteristics were conceptualized to be related to the perceptions held by agricultural producers. Moreover, certain farm characteristics were thought to have an affect on the levels of perceptions held by producers. Furthermore, with the theme of this study associated with state-of-the-art technological information, individual producers' perceived level of future needs for increasingly complex technological information was theorized to be related to their perceptions of the NCAES' capacity to deliver needed technological information.

In addition to the articulated relationships between producers' perceptions and the independent factors chosen for study, there was also support from the literature for theorizing a relationship between perceptions and attitudes. Due to the related nature of perceptions and attitudes and their possible affect on one's thoughts and behavior, the factor of producers' attitudes toward the NCAES was selected as a potential intervening variable on the perceptions that the producer may hold toward the NCAES' capacity to provide needed technological information.

The ultimate conceptual framework for this study included agricultural producers perceptions of the NCAES' current and future capacity to deliver state-of-the-art technological information as the dependent variable, and (1) selected personal factors, (2) selected farm characteristics, and (3) producers' perceived future need for highly developed technological information as the independent variables. The variable of attitudes held toward the NCAES was theorized to be a mediating

factor in the formation of producers' perceptions, and therefore, was included in the conceptual design as an intervening variable.

Study Purposes and Objectives

In order to determine if the agricultural educational programs of (NCAES) are effectively meeting the current technological needs of its clientele, and whether those programs will continue to do so in the future, this study of current agricultural clientele was conducted. The specific purposes of the study were to determine (1) North Carolina agricultural producers' perceptions of the current and future capacity of the NCAES to deliver state-of-the-art technological information, and (2) the relationships between those perceptions and selected personal factors, farm characteristics, and producer's perceived level of future needs for highly developed technological information. These relationships, in turn, are examined when attitudes toward the NCAES are controlled.

Description of Population and Research Methodology

North Carolina agricultural producers who actively use the services of NCAES and whose farming activities produce at least $10,000 annually were the focus of this study. Those persons were identified by County Extension Directors in each of the selected counties.

In order to assure a sample population representing the Coastal Plain, Piedmont, and Mountain regions of North Carolina, two counties were randomly selected from each of the Extension districts in North Carolina. Further, to assure an adequate number of agricultural producers, only those counties with

agricultural income above the respective district median were included in the sampling procedure.

Those counties selected were Columbus and Greene, in the Southeastern District; Edgecombe and Chatham, in the North Central District; Randolph and Surry in the Northwestern District; Cabarrus and Cleveland in the Southwestern District, and Rutherford and Haywood, in the Western District.

A mailed survey instrument was the form of data collection. The instrument was mailed to 1,178 agricultural producers in those twelve counties listed. Of the instruments mailed, 702 usable instruments were returned, for a 60 per cent return rate.

Producers' perceptions were measured on a 30 point cumulative scale with a score of three as the most positive perceptions and 30 as the least positive. This scale resulted from each of the three perception questions having a measured scale of one through ten. Those questions were (1) How would you rate the Agricultural Extension Service as a primary information source for the latest technology that you can use in your farming operation? (2) Considering all of your sources of usable information for your farming operation, what is your present dependence upon the Extension Service as compared to your other information sources? (3) As you project five years into the future, at what level do you feel that you can depend on the Extension Service for your needed agricultural information as compared to other information sources? Other questions on the survey related to independent variables of age and educational

levels and the farm characteristics of gross income levels, employment status (full or part-time farmers); percent of total income from farming if part-time; type of major enterprise; and size of major enterprise.

In addition to the personal and farm characteristics, a separate question dealt with the producers' projected needs for increasingly high levels of technological information in order to remain in farming in the future.

In order to determine attitudes held by those farmers surveyed toward Extension, a ten part modified semantic differential was used.

The primary statistical procedure used in testing this research was Pearson's Product Moment Correlation Coefficient.

Research Findings

The producers who responded to the questionnaire varied widely in age and formal education as well as farm characteristics.

Table 1. Distribution of respondents by personal factors (N=702)

Factor	Respondents N	%
Level of formal education:		
Less than high school	73	10.4
High School graduate	286	40.9
Some College	163	23.3
College Graduate or more	177	25.4
Total	699	100.0
Age, yr:		
22-39	185	28.7
40-49	139	21.6
50-59	150	23.3
60 or more	170	26.4
Total	644	100.0

The frequency distributions indicated that almost 5 out of 10 (47 percent) of the agricultural producers operated medium-sized farms, with gross 1985 farm income ranging from $40,000 to $249,999. Slightly more than 1 out of 10 (14 percent) were operators of large farms (gross 1985 farm income of $250,000 or more). Among the agricultural producers surveyed 7 out of 10 (71 percent) were full-time farmers, while slightly more than 5 out of 10 of the part-time farmers derived 25 percent or less of their annual income from farming. At least 11 different agricultural commodities were listed by responding farmers as major farm enterprises. Included among those commodities were the major crops and livestock produced in North Carolina.

Over 81 percent of the producers perceived their future need for more complex technological information to be "somewhat more" (48 percent) or "much more (33 percent) than their current needs.

Table 2. Distribution of respondents, by level of perceived future needs for highly developed technological information (N=702)

Level of perceived future needs	Respondents N	%
Same level or less	125	18.5
Somewhat more	329	48.3
Much more	226	33.2
Total	680	100.0

On the perception measure, about two-thirds of the respondents held moderately high to highly positive perceptions and about 90 percent of the respondents indicated a positive perception of

Extension's ability to deliver needed technological information. Only about 10 percent indicated negative perceptions. The overall mean perception score was 10.01. The distribution of the respondents by level of perception is shown in Table 3.

Table 3. Distribution of respondents by level of perception of the current and future capacity of the NCAES to deliver state-of-the-art technological information (N=702)

Level of perception	Mean Score	Respondents N	Respondents %
High	3-7	221	33.1
Moderate	8-11	203	30.4
Low	12-30	244	36.5
Total		668	100.0

The high positive perception rating indicates the respondents generally have had positive experiences with Extension (Richardson, 1987). In support of this finding, the intervening variable of farmers' attitudes toward Extension indicated generally strong positive attitudes toward the NCAES. The analysis of the measurement of attitudes indicated a strong correlation between the attitudes producers hold toward NCAES and those farmers perceptions of Extension's capacity to deliver needed information.

Table 4. Relationships between North Carolina Agricultural producers' perceptions of the current and future capacity of the NCAES to deliver state-of-the-art technological information and their attitudes toward the NCAES

Factor	Mean Score	Standard deviation	Correlation coefficient
Perception	10.01	4.9	.66*
Attitudes	19.72	14.7	

*Significant at .05 level

Another variable that was found to be highly correlated to perceptions was the producers perceived need for increasingly complex technological information in the future.

Table 5. Relationship between North Carolina agricultural producers' perceptions of the current and future capacity of the NCAES to deliver state-of-the-art technological information and their perceived level of future needs for highly developed technological information

Factor	r-value
Technological information needs	.499*

*Significant at .05 level.

Among the farm characteristics, only type of major enterprise was significantly related (<.05) to the producers' perceptions of Extension's capacity to provide needed information currently and in the future. Of the personal characteristics studied, only education level was significantly (<.05) related to the producers perceptions. This correlation was quite

weak, and little inference could be drawn from this finding.

Table 6. Relationships between North Carolina agricultural producers' perceptions of the current and future capacity of the NCAES to deliver state-of-the-art technological information and the personal factors of level of formal education and age

Personal Factors	r-value
Level of formal education	-.10*
Age, yr	-.04

*Significant at .05 level.

Implications

The findings of this research may be of benefit as Extension develops programs and organizational and management systems designed to meet the specific needs of a wide diversity of agricultural producers, both now and in the future.

If Extension is to continue to maintain positive perceptions among its agricultural producer clientele, its resources must be effectively allocated to assure that personnel with a high degree of technical training are strategically positioned within the state to meet the indicated advancing technological needs of those who remain in the farming business.

With the current trend toward fewer resources available to Extension, it is necessary that those resources be allocated to personnel and support resources whereby those Extension professionals employed can effectively disseminate the latest technological information that is relevant to specific clientele groups such as those with different major enterprises. To

achieve this goal, attention must be directed toward in-service training programs for Extension professionals. This training should not only include the latest technologies, but also the Extension education process including effective communication skills and innovative and advanced program delivery so that Extension professionals can indeed focus directly on the specific needs of its audiences.

In order to continue to maintain a positive image as a responsive, needs-oriented agency that effectively delivers usable technological information to all types of producers, whether they are marginal part-time or highly advanced full-time, informational delivery strategies will need to be appropriately varied. The most advanced producers may need information that has only recently been released from reserch programs and is sufficiently complex that only a highly trained specialist can deliver it appropriately. The part-time farmer, on the other hand, may need only a how-to recommendation that could be communicated via video tape, radio, newspaper or personally by a generalist or agricultural technician. An appropriate networking with agribusiness firms could provide adequate solutions to some clientele problems without direct contact with Extension personnel.

One finding was that as educational levels of producers advance, their level of positive perceptions of NCAES' capacity to provide needed technological information also increases. Therefore, in order to maintain this standing with more highly educated producers, Extension will need to exercise every effort to stay abreast of developing technology and deliver that

technology effectively to producers in an understandable and efficient manner that will be accepted and used by those highly educated producers. Further, for those producers less well educated, Extension professionals will need to be cognizant of the most understandable and effective means for providing technological information to this clientele group in order to meet the needs of all producers, and to maintain the credibility of Extension as an agency for service to all relevant clientele.

Dr. John G. Richardson is Extension Specialist-Educational Programs, N.C. Agricultural Extension Service, College of Agriculture and Life Sciences, North Carolina State University, Raleigh, North Carolina.

Dr. R. David Mustian is Professor and State Leader of Evaluation, North Carolina Agricultural Extension Service, College of Agriculture and Life Sciences, North Carolina State University, Raleigh, North Carolina.

For additional information, contact the lead author, Box 7607, Raleigh, North Carolina 27695-7607

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